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IS 8967-2 (1983): Farm Drainage Clay Tiles, Part 2:
Perforated Tiles with Collar Joints [FAD 17: Farm
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IS : 8967 (Part 2) - 1983

Indian Standard

**SPECIFICATION FOR
FARM DRAINAGE CLAY TILES**

PART 2 PERFORATED TILES WITH COLLAR JOINTS

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NEW DELHI 110002

Indian Standard

SPECIFICATION FOR FARM DRAINAGE CLAY TILES

PART 2 PERFORATED TILES WITH COLLAR JOINTS

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Indian Standard

**SPECIFICATION FOR
FARM DRAINAGE CLAY TILES**

PART 2 PERFORATED TILES WITH COLLAR JOINTS

0. FOREWORD

0.1 This Indian Standard (Part 2) was adopted by the Indian Standards Institution on 30 August 1983, after the draft finalized by the Farm Drainage Tiles Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Farm drainage clay tiles, also known as clay pipes, are being used for sub-surface drainage of agricultural land. This standard is intended to assist in production of quality tiles.

0.3 The clay tiles used for farm drainage purpose are generally of two types : (a) tiles with open joints, and (b) perforated tiles with collar joints. This part covers the requirement of perforated tiles with collar or socket joints, Part 1 covering the tiles with open joints has already been published.

0.4 In the formulation of this standard, assistance has been derived from ASTM C 498-1965 (Reapproved 1975) 'Specification for perforated clay drain tile' issued by the American Society for Testing and Materials, Philadelphia, USA.

0.5 For purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*),

1. SCOPE

1.1 This standard (Part 2) covers the requirements and methods of test for perforated clay tiles with collar joints for farm drainage purposes.

2. MATERIAL

2.1 The tiles shall be made from clay, shale, fireclay, or mixture thereof and burnt.

3. CLASSIFICATION

3.1 For the purpose of this standard, the clay tiles based on their physical properties (*see 6.1*) shall be of the following classes:

- a) Light-duty tiles,
- b) Medium-duty tiles,
- c) Heavy-duty tiles, and
- d) Extra-heavy duty tiles.

4. DIMENSIONS AND TOLERANCES

4.1 The nominal size (internal diameter) of the light-duty tiles shall be 100, 125, 150, 200, 250, 300, 350 and 375 mm whereas for medium duty, heavy duty and extra heavy duty the sizes shall be 100, 125, 150, 200, 250, 300, 350, 375, 400 and 450 mm.

NOTE — It is suggested that sizes up to 150 mm should be used for lateral drains. The sizes higher than 150 mm should be used for conduit purposes.

4.1.1 Permissible variation in internal diameter for all the classes of tiles shall be ± 3 percent.

4.2 The thickness of the tile shall be such that tile shall meet the physical requirements (*see 6.1*).

4.2.1 Permissible variation between minimum and maximum internal diameters of the same tile at the ends shall be 75 percent of the wall thickness for light duty and 65 percent for medium duty, heavy duty and extra heavy duty.

4.3 Tile smaller than 300 mm in internal diameter shall have a length not less than 300 mm. The tiles having internal diameter of 300 to 450 mm shall have nominal length not less than their internal diameter.

4.3.1 Permissible variation of measured length from the manufacturer's declared length shall be ± 3 percent.

4.4 Unless otherwise specified by the purchaser, the perforation requirement shall be as given in **4.4.1**.

4.4.1 Perforations shall be circular punched holes 6.0 ± 1.5 mm in diameter, arranged in rows parallel to the axis of the tiles. Perforation shall be approximately 75 mm centre to centre, along the rows, and the minimum number of rows shall be as given in Table 1. Where two rows of perforations are used, the rows shall be separated by an arc of $90 \pm 10^\circ$. Where 4 rows of perforations are used, the rows shall be located in the lower half of the tiles and shall be symmetrical around the vertical centre line. The lowermost rows of perforations shall be separated by an arc of $90 \pm 10^\circ$ and the uppermost row shall be separated by an arc of not more than 160° measured around the lower part of the tile (see Fig. 1). If more than 4 rows of perforations are used, the spacing of rows between these limits shall be uniform.

TABLE 1 NUMBER OF PERFORATIONS

SL No.	TILE SIZE, mm	MINIMUM NUMBER OF ROWS OF PERFORATIONS	MINIMUM NUMBER OF PERFORATIONS PER ROW FOR NOMINAL LENGTHS OF TILE				
			0.3 m	0.45 m	0.6 m	0.75 m	0.9 m
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	100, 125, 150	4	3	5	7	9	11
ii)	100, 125, 150	2	5	8	11	13	15
iii)	200, 250, 300	4	3	5	7	9	11
iv)	350 to 450	6	—	5	7	9	11

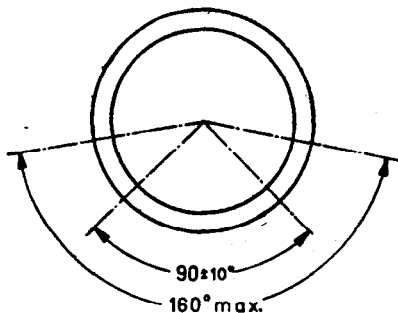
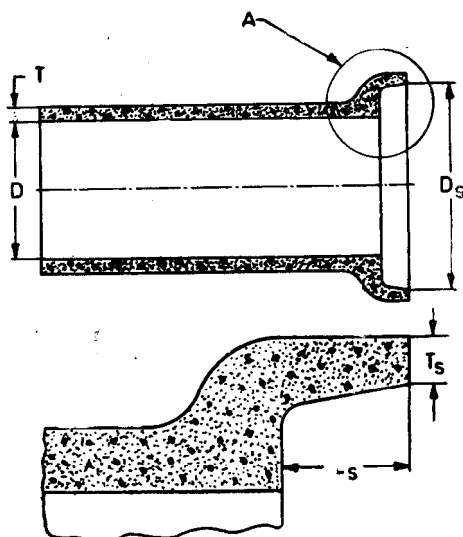


FIG. 1 SPACING OF FOUR ROWS PERFORATIONS

4.5 The inside diameter at mouth of socket (see D_s in Fig. 2) and the depth of socket (see L_s in Fig. 2) for various sizes of the tiles shall be as given in Table 2. The minimum thickness of the socket (see T_s in Fig. 2) shall be $\frac{3}{4}$ of the thickness of the tile for all the sizes. The measurement of the T_s shall be taken 6 mm from the outer end of the socket.

TABLE 2 DIMENSION OF SOCKET

SL No.	TILE SIZE (D)	INSIDE DIAMETER AT MOUTH OF SOCKET D_s	DEPTH OF SOCKET L_s
(1)	(2)	(3)	(4)
	mm	mm	mm
i)	100	150	40
ii)	125	175	45
iii)	150	210	50
iv)	200	275	57
v)	250	330	65
vi)	300	390	65
vii)	350	475	65
viii)	375	500	65
ix)	400	525	65
x)	450	565	70



ENLARGED DETAIL AT A

FIG. 2 DIMENSIONS OF PERFORATED CONCRETE PIPE

5. GENERAL REQUIREMENTS

5.1 The tiles shall be uniformly well burnt.

5.2 The tiles shall be uniform in size, shape and free from irregularities, such as cracks and laminations.

5.3 The tiles shall be free from impurities like particles of stone, lime and other foreign materials visible to the naked eye on the surface or on the fractured surface of the tiles obtained by breaking the sample for crushing strength test.

5.4 The tiles shall be free from any minerals or chemicals that are known to cause slaking or disintegration of the tiles.

6. PHYSICAL REQUIREMENTS

6.1 When tested in accordance with the method given in Appendix A of IS : 8967 (Part 1)-1978*, the specified class of tiles shall conform to the physical requirements as prescribed in Table 3.

6.2 When measured in accordance with the procedure laid down in 3 of IS : 3495 (Parts 1 to 4)-1976* maximum warp shall not exceed 3 percent of the length of the tile.

7. SAMPLING

7.1 For type testing, 5 tiles shall be selected at random. For lot acceptance, unless otherwise agreed to between the purchaser and the supplier, the sampling procedure as given in Appendix B of IS : 8967(Part 1)-1978*, shall be followed.

8. MARKING AND PACKING

8.1 **Marking** — Each tile shall be marked in a suitable manner with the following information:

- a) Manufacturer's name or identification mark,
- b) Class,
- c) Size, and
- d) Length.

*Specification for farm drainage clay tiles: Part 1 Tiles with open joints.

†Methods of tests of burnt clay building bricks.

TABLE 3 PHYSICAL REQUIREMENTS FOR PERFORATED CLAY TILE

(Clause 6.1)

SL NO.	INTERNAL DIAMETER OF TILE, mm	LIGHT-DUTY TILE				MEDIUM-DUTY TILE				HEAVY-DUTY TILE, MINIMUM CRUSHING STRENGTH, kN/m		EXTRA-HEAVY DUTY TILE, MINIMUM CRUSHING STRENGTH, kN/m	
		Minimum Crushing Strength, kN/m		Maximum Water Absorption of 5-h Boiling, Per- cent		Minimum Crushing Strength, kN/m		Maximum Water Absorption by 5-h Boil- ing, Percent					
		Average of five tiles	Indivi- dual tile	Average of five tiles	Indivi- dual tile	Average of five tiles	Indivi- dual tile	Average of five tiles	Indivi- dual tile			Average of five tiles	Indivi- dual tile
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
i)	100	11.7	9.9	13	16	16.0	14.4	11	13	20.4	18.4	29.2	26.3
ii)	125	11.7	9.9	13	16	16.0	14.4	11	13	20.4	18.4	29.2	26.3
iii)	150	11.7	9.9	13	16	16.0	14.4	11	13	20.4	18.4	29.2	26.3
iv)	200	11.7	9.9	13	16	16.0	14.4	11	13	21.9	19.7	31.2	28.0
v)	250	11.7	9.9	13	16	16.0	14.4	11	13	22.6	20.4	32.1	28.9
vi)	300	11.7	9.9	13	16	16.0	14.4	11	13	24.8	22.3	35.3	31.7
vii)	350	12.3	10.5	13	16	16.0	14.4	11	13	27.0	24.2	38.5	34.6
viii)	375	12.7	10.8	13	16	16.8	15.0	11	13	28.9	26.0	40.9	36.8
ix)	400	—	—	—	—	17.5	15.8	11	13	30.6	27.6	43.8	39.4
x)	450	—	—	—	—	19.0	17.1	11	13	34.1	30.6	48.1	43.3

NOTE — Water absorption requirement for heavy duty and extra-heavy duty tiles shall be the same as given for medium duty tiles.

8.1.1 Each tile may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8.2 Packing — The tiles may be packed for safe handling as agreed to between the purchaser and the supplier.

INDIAN STANDARDS

ON

FARM DRAINAGE TILES

IS:

8967 Farm drainage clay tiles:

8967 (Part 1)-1978 Tiles with open joints

8967 (Part 2)-1983 Perforated tiles with collar joints

8968-1978 Farm drainage concrete tiles

9271-1979 Farm drainage plastic pipes

9633-1980 Farm drainage asbestos cement pipes

9696-1980 Code of practice for installation for farm drainage tile (pipe) system

9979-1981 Code for design and laying of mineral filters for tile drain system